

## State Intellectual Property Office of P.R.C

Addressee: Tianshu Zhang Tee & Howe Intellectual Property Attorneys Suite 718, Capital Times Square, No. 88 Xichang'an Street, Xicheng District, Beijing 100031	Issuing Date:  March 17, 2006
Filing Number: 038190664	

Applicant: Sumitomo Electric Industries, Ltd.
Invention Title: Aluminum Nitride Sintered Compact, Metallized Substrate, Heater, Jig And Method For Producing Aluminum Nitride Sintered Compact

### Notification of the First Office Action

A national phase application based on a PCT application

1. ☒ Applicant made the request for substantive examination. In accordance with the provisions of Paragraph 1 of Article 35 of the Patent Law, the Examiner has proceeded with the examination as to substance of the above-identified patent application for invention.  
☐ In accordance with the provisions of Paragraph 2 of Article 35 of the Patent Law, the Patent Office has, on its own initiative, decided to proceed with the examination as to substance of the same.
2. ☒ Applicant claims  
August 13, 2002, when the previous application was filed with JP, as a priority date;  
\_\_\_\_\_, when the previous application was filed with \_\_\_\_\_, as a priority date;  
\_\_\_\_\_, when the previous application was filed with \_\_\_\_\_, as a priority date.
3. ☐ The amendment submitted by applicant on \_\_\_\_\_ has been rejected under Rule 51 of the Implementing Regulations of the Patent Law.  
☐ For the reasons indicated in the text of this Action, the following documents submitted have been rejected under Article 33 of the Patent Law:  
☐ The Chinese translation of the annex to the international preliminary examination report;  
☐ The Chinese translation of the amendments under Article 19 of PCT;  
☐ The amendments under Article 28 or 41 of PCT;  
☐ \_\_\_\_\_
4. ☐ The application has been examined on the basis of the translation of the originally filed international application;  
☒ The application has been examined on the basis of the following documents:  
☒ Description, pages 1, 7, 12, 19-20, 22, 29, as in the translation of the originally filed international application;  
pages 2-6, 9-11, 13, 16-18, 21, 23-28, as in the translation of the annex to the IPER;

pages\_\_\_\_, as in the amendments under Article 28 or 41 of PCT;  
pages 8, 14, 15, as in the amendments under Rule 51 of the Implementing Regulations.

☒ Claims, No.\_\_\_\_, as in the translation of the originally filed international application;  
No.\_\_\_\_, as in the translation of the amendments under Article 19 of PCT;  
No. 1-33, as in the translation of the annex to the IPER;  
No.\_\_\_\_, as in the amendments under Article 28 or 41 of PCT;  
No.\_\_\_\_, as in the amendments under Rule 51 of the Implementing Regulations.

☒ Drawings, sheets 1-8, as in the translation of the originally filed international application;  
sheets\_\_\_\_, as in the translation of the annex to IPER;  
sheets\_\_\_\_, as in the amendments under Article 28 or 41 of PCT.  
sheets\_\_\_\_, as in the amendments under Rule 51 of the Implementing Regulations.

☒ The following references are cited in the notification. (The codes of the references will be used in further examination procedures):

Code	Reference No. or Title	Publication Date (or Filing Date of a Conflicting Application )
1	CN 1130607A	September 11, 1996
2		
3		
4		

**5. Conclusive opinion:**

☐ regarding the Description

- ☐ Its content belongs to the scope of Article 5 of the Patent Law, which cannot be granted.
- ☐ It is not in conformity with the provisions of Paragraph 3 of Article 26 of the Patent Law.
- ☐ It is not in conformity with the provisions of Article 33 of the Patent Law.
- ☐ The presentation manner of the Description is not in conformity with Rule 18 of the Implementing Regulations of the China Patent Law.

☒ regarding the Claims:

☒ Claims 1, 24, 25 do not possess novelty under Paragraph 2 of Article 22 of the Patent Law.

☒ Claims 23-30 do not possess inventiveness under Paragraph 3 of Article 22 of the Patent Law.

☐ Claims\_\_\_\_ do not possess practical applicability under Paragraph 4 of Article 22 of the Patent Law.

☐ Claims\_\_\_\_ belong to the scope of Article 25 of the Patent Law, which cannot be granted.

☐ Claims\_\_\_\_ do not meet the requirements of Paragraph 4 of Article 26 of the Patent Law.

☐ Claims\_\_\_\_ do not meet the requirements of Paragraph 1 of Article 31 of the Patent Law.

☐ Claims\_\_\_\_ do not meet the requirements of Article 33 of the Patent Law.

☐ Claims\_\_\_\_ do not meet the requirement of Paragraph 1 of Rule 13 of the Implementing Regulations of the China Patent Law.

- ☐ Claims \_\_\_\_ do not meet the requirement of Paragraph 1 of Rule 2 of the Implementing Regulations of the China Patent Law.
- ☐ Claims \_\_\_\_ do not meet the requirements of Rules 20 of the Implementing Regulations of the China Patent Law.
- ☐ Claims \_\_\_\_ do not meet the requirements of Rules 21 of the Implementing Regulations of the China Patent Law.
- ☐ Claims \_\_\_\_ do not meet the requirements of Rules 22 of the Implementing Regulations of the China Patent Law.
- ☒ Claim 25 does not meet the requirements of Rules 23 of the Implementing Regulations of the China Patent Law.

Please refer to the text of the Action in detail for the above.

**6. Based on the above conclusive opinion, the Examiner points out that**

- ☐ applicant should amend the application documents according to the requirements of the text of the Action.
- ☒ applicant should state the reason that the application may be granted a patent right in the observation and amend the application documents according to the teaching of the text of the Action, otherwise the application may not be granted.
- ☐ no substantive contents to be granted are presented in the application. If applicant does not submit his observation or the observation is not reasonable, the application will be rejected.

**7. The following items shall come to applicant's attention:**

- ( 1 ) According to Article 37 of the Patent Law, applicant should submit his observation within 4 months from the date he receives the notification. If, without any justified reasons, the time limit for making a response is not met, the application will be deemed to have been withdrawn.
- ( 2 ) The amendments to the application documents should meet the requirements of Article 33 of the Patent Law. The amended documents should be submitted in two copies and the amending manner should comply with the relevant regulations of the Examination Guide.
- ( 3 ) The observation and / or amended documents should be mailed to or submitted directly to the Receiving Section of the Patent Office, and no other submissions have legal effects.
- ( 4 ) Applicant and / or attorney may not have a meeting with the Examiner unless an appointment has been made in advance.

**8. The text of this Action consists of 4 page(s), including the following annexes:**

- ☐ the cited references \_\_\_\_ page(s), \_\_\_\_ copy(ies).
- ☐ \_\_\_\_\_

### Text of Notification of the First Office Action

Upon the Applicant's request for substantive examination, the Examiner has conducted an examination as to substance of the current application on the basis of the Chinese translation of the originally filed Specification as well as the amendments to the Specification. The following are the Examiner's comments:

1. Independent claim 1 of the current application relates to an aluminum nitride sintered body. However, in independent claim 1, only some apparent dimensions and surface characteristics of the aluminum nitride sintered body, for example, length, thickness, warpage, waviness height, etc., were set forth as its technical features. Therefore, the aluminum nitride sintered body defined by the independent claim 1 of current application has no substantial difference from a conventional aluminum nitride sintered body because by using a conventional mechanical or physical processing method, a conventional aluminum nitride could be processed into the aluminum nitride sintered body with above-mentioned apparent dimensions and surface characteristics.

The Reference 1 (CN1130607A) cited in this notification describes an aluminum nitride ceramic (sintered body) and a method for producing the same. It can be seen that an aluminum nitride sintered body (ceramic) has already been publicly known and used. Hence, the independent claim 1 does not possess the novelty under Paragraph 2 of Article 22 of the Chinese Patent Law.

2. Independent claim 23 of the current application also relates to an aluminum nitride sintered body. Nevertheless, only the following technical features of the aluminum nitride sintered body are set forth in the claim 23: some apparent dimensions and surface characteristics of the sintered body, for example, length, thickness, warpage, waviness height, etc., and polishing of the sintered body. Therefore, the aluminum nitride sintered body defined by independent claim 23 (erroneously typed as claim 1 by the Examiner) of current application has no substantial difference from a conventionally polished aluminum nitride sintered body, because by using a mechanical or physical processing method, a conventional

aluminum nitride could be processed into the aluminum nitride sintered body with above-mentioned apparent dimensions and surface characteristics and the thus produced sintered body could also be polished by a physical or a chemical polishing method.

Since the Reference 1 cited in this notification describes an aluminum nitride ceramic (sintered body) and a method for producing the same, it is very clear that an aluminum nitride sintered body (ceramic) has already been publicly known and used.

Therefore, the aluminum nitride sintered body of independent claim 23 only differs from the sintered body disclosed by the Reference 1 in that the sintered body of claim 23 has been polished. For an ordinary skilled person in the art, it is apparently conceivable and can be easily achieved that an aluminum nitride ceramic or sintered body is polished to meet requirements for practical uses. Therefore, independent claim 23 does not meet the requirement of the inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

3. Each of dependent claim 24 (as being dependent from the independent claims 1 or 23) and dependent claim 25 (as being dependent from the independent claim 1 or 23 or the dependent claim 24) respectively further defines the sintered body in terms of thickness and thermal conductivity thereof, thus does not have any substantially technical difference from the above-mentioned independent claims. Hence, on the basis that the independent claim 1 lacks novelty and the independent claim 23 does not involve an inventive step, the dependent claims 24 and 25 are also rejected as failing to meet the requirements of novelty and inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

4. Independent claim 26 relates to a metallized substrate. The substantial technical feature of claim 26 resides in the electrically conductive metallized layer formed on at least a part of the surface of a substrate made of the above-mentioned aluminum nitride sintered body. An aluminum nitride sintered body is frequently employed as a substrate plate of an electronic apparatus due to its outstanding thermal conductivity, therefore, for an ordinary skilled person in the art, it is conceivable and can be easily achieved that, a metallized layer or metal coating is formed on at least a

part of the surface of the aluminum nitride sintered body for thermal or electric conductivity. Hence, on the basis that the above-mentioned sintered body does not possess novelty or does not involve an inventive step, the dependent claims 26 is also rejected as failing to meet the requirement of inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

5. Independent claim 27 also relates to a metallized substrate. The substantial technical features of claim 27 include an electrically conductive metallized layer formed on at least a part of the surface of a substrate made of the aluminum nitride sintered body as well as some apparent dimensions and surface characteristics of the above-mentioned sintered body. An aluminum nitride sintered body is frequently employed as a substrate plate of an electronic apparatus due to its outstanding thermal conductivity, therefore, for an ordinary skilled person in the art, it is apparently conceivable and can be easily achieved that, a metallized layer or metal coating is formed on at least a part of the surface of the aluminum nitride sintered body for thermal or electric conductivity. Hence, on the basis that the above-mentioned sintered body does not possess novelty or does not involve an inventive step, the dependent claim 27 is also rejected as failing to meet the requirement of inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

6. Independent claim 28 relates to a heater. The substantial technical feature of claim 28 resides in that an electrode and an insulating layer are arranged on the metallized substrate defined by independent claim 26 or 27 so as to constitute a heater. Obviously, for an ordinary skilled person in the art, it is conceivable and can be easily achieved that a metallized substrate having outstanding thermal and electric conductivity is used as a part of electrical heater. One of the most commonly used methods is to galvanize and to form a protective insulating layer on the metallized substrate. In consideration of these well known knowledge, for an ordinary skilled person in the art, it is easily conceivable and can be easily achieved that an electrode is arranged (to galvanize) and an insulating layer (insulating protection) is formed on the metallized substrate defined by independent claim 26 or 27. Therefore, on the basis that the metallized substrate defined in either independent claim 26 or claim 27

does not involve an inventive step, the dependent claims 28 is also rejected as failing to meet the requirement of inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

7. Independent claim 29 relates to a method for producing an aluminum nitride sintered body. The substantial technical features of the claim include the following steps:

preparing a raw material comprising a binder and a major material of aluminum nitride; forming a sheet-shaped molded body using the raw material; drying the molded body for above 10 hours; removing the binder; and sintering the sheet-shaped molded body, wherein the sintering step is performed by arranging the molded body in a space surrounded by a jig comprising boron nitride, wherein the ratio of the volume of the molded body to the volume of the space is in the range of 20% to 60%.

The Reference 1 cited in this notification also disclosed a method for producing an aluminum nitride sintered body (ceramic) comprising the following steps:

preparing a raw material comprising a binder and a major material of aluminum nitride; forming a sheet-shaped molded body using the raw material; removing the binder (eliminating glue); and sintering the sheet-shaped molded body, wherein the sintering step is performed by arranging the molded body in a flowing nitrogen as a protection atmosphere.

It can be seen that, claim 29 and the method disclosed in the Reference 1 have the following two differences: (1) the Reference 1 does not describe the drying step and drying time; (2) independent claim 29 employs a boron nitride jig (actually a boron nitride sagger) with good thermal conductivity and thermal-resistance to protect the sheet-shaped molded body, while Reference 1 adopts a flowing protection atmosphere – nitrogen to protect the sheet-shaped molded body.

As the water content in a green body will directly affect the rigidity of the green body, for an ordinary skilled person in the art, it is easily conceivable and can be easily achieved that a green body is subjected to a drying step for a period based on

its physical property and water content to obtain the required rigidity. During a sintering step, two of the most commonly used means for protecting a sintered body are the means of applying a protection atmosphere or employing a sagger. For an ordinary skilled person in the art, it is easily conceivable and can be easily achieved that these two means are exchangeable and there is no technical difficulty in the replacement of one means for the other. Therefore, independent claim 29 does not have any substantial difference compared with the disclosure by the Reference 1.

Hence, independent claim 29 is also rejected as failing to meet the requirement of inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

8. Dependent claim 30 further defines the manner of arranging a sintered body in the jig described in the independent claim 29, thus does not have any substantial technical difference from the independent claim 29. On the basis that the independent claim 29 lacks an inventive step, the dependent claim 30 is also rejected as failing to meet the requirement of inventiveness under Paragraph 3 of Article 22 of the Chinese Patent Law.

9. As being a multiple dependent claim itself, dependent claim 25 also suffers from a defect of referring to another multiple dependent claim. Therefore, claim 25 fails to meet the requirement under Paragraph 2 of Rule 23 of the Implementing Regulations of the Chinese Patent Law.

10. The applicant has ever cancelled the originally filed claims 2 to 22, whereas the applicant did not serially renumber the remaining claims. The applicant is required to serially renumber the pending claims.

11. In fact, the very true technical solution of the current invention is the jig (actually an improvement of a sagger) used for sintering an aluminum oxide sintered body, wherein a depressed portion is formed to arrange a molded body on the surface of a boron nitride plate base, so as to prevent the sintered body from a warpage and crack.

Based on above reasons, the current patent application can not be granted as it is. However, the application is allowable if the applicant amends the application in line with the Examiner's comments made above to overcome all the outstanding



defects. Please note that any amendment to application shall meet the requirement under Article 33 of the Chinese Patent Law. That is, the amendment shall not go beyond the scope as defined by the initially filed description and claims.

Examiner: Qiang Miao

Code: B503